

Originally sent April 13, 1998

Via e-mail

Richard Woodard
CALFED Bay-Delta Program

Bruce MacIer
US EPA

Dear Rick and Bruce:

In my recent correspondence I have mentioned that I had reviewed part of the CALFED WQTG draft Water Quality Program Plan released January 5, 1998 but have not had the time nor the support necessary to complete this review. As preparation for the April 15 meeting I have taken the time to finalize my comments on the first 19 pages of this Plan. These comments are presented below. While I have only been able to address the first 19 pages, from reviewing the remainder of the Plan I find that highly significant technical problems exist throughout it. Many of these problems are problems that I have commented on previously. Basically the Plan needs to be rewritten by individuals who understand the water quality issues that the CALFED WQTG must address if the Water Quality Management Plan is to become a credible program for appropriately using CALFED funds to "fix" the water quality problems of the Delta.

Many of the comments enclosed on the first 19 pages are repeats of comments that I have made previously over the past year. In document after document, CALFED staff have repeated the same technical errors. If WQTG is to begin to formulate a technically valid, cost-effective and protective water quality management plan for the Delta, a significantly different approach is going to have to be taken in working with those who take the time to provide comments on draft documents. One of the reasons I did not continue to review the draft Plan when I first received it last January was that I found that I developed eight pages of comments on the first 19 pages of the Plan. These comments discuss significant technical errors in the development of the Plan covered by these 19 pages. In a number of cases I had provided comments on the same issues two or three times over the past year, only to find that my comments were ignored in the development of the draft Plan.

After I submitted my first set of comments in January 1998, you (Rick) contacted me to indicate that it was CALFED's policy not to respond to comments. It also appears that it is CALFED's policy, at least in the WQTG, to ignore comments on problems with basic technical issues. If the CALFED WQTG is to gain credibility as an appropriate organization for addressing water quality problems in the Delta, it must establish a significantly different approach than has existed in the past for addressing comments. If someone takes the time to provide comments in response to a request for comments, the WQTG management must respond to those comments or

they will lose the support of those who could be of significant assistance in putting the Water Quality Management Program on a technically valid basis.

If someone on the WQTG staff or others feel that for political or other reasons the comments made by a reviewer are technically inappropriate, then the technical issue in dispute should be independently peer-reviewed by knowledgeable experts in a full, public, interactive peer review arena. I am confident that if this approach had been followed as I suggested a year ago, the CALFED WQTG would now have a draft Plan that was beginning to meaningfully address defining appropriate parameters of concern, developing an appropriate approach for determining whether these parameters are causing real, significant water quality problems in the Delta or to Delta resources and formulating technically valid, cost-effective and protective approaches for managing these problems.

If either of you or others have questions on this letter or my comments on the first 19 pages of the draft Plan, please contact me.

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Dear Rick:

In response to your request, I wish to provide the following comments on the proposed CALFED "Water Quality Program Plan" dated January 5, 1998.

Page viii Glossary presents a definition of WQTG program parameters of concern target values based on water quality criteria/standards. I wish to reiterate again that CALFED is continuing in an inappropriate direction by designating target values for parameters of concern based on worse-case criteria/standards under conditions where, for many of these parameters of concern, there is no real known/verified water quality problem in the Delta or its tributaries that

has been adequately documented. In time, CALFED will have to back away from its currently proposed target values, since it will be found that these target values are inappropriate goals for managing real, significant water quality problems within the Delta and its tributaries.

As I discussed a year ago, there is no need for CALFED to establish water quality target values at this point unless CALFED management is still persisting with its inappropriately developed approach of trying to use mathematical models to relate concentrations of the parameters of concern to water quality impacts and, most importantly, the changes in the water quality impacts/beneficial uses as a function of controlling the loads of parameters of concern to the Delta or part of the watershed. That approach is not reliable since the field does not know how to relate a constituent chemical concentration to beneficial uses in the Delta and its tributary waters. Since my original comments of a year ago, I have raised the question several times of what is going to be done with target values that have been established and, thus far, I have not received the requested information. This Plan should clearly state how the target will be used in formulating and implementing the Water Quality Management Plan for the Delta.

Page 1, "Introduction," lists six "solution principles" as fundamental guides for evaluating alternative solutions. A review of the "principles" shows that being technically valid is not part of the CALFED Water Quality Management Program. For CALFED's program to be a long-term success, the best possible science and engineering need to be incorporated into the social, political, and economic processes that influence water quality management. This is an important area that has thus far been inadequately addressed in the Water Quality Technical Group. I urge CALFED management to broaden the scope of its activities to include being based on technically valid, modern (at least 1990) science and engineering.

Page 2, left column, discusses stakeholder involvement in development of the program. One of the problems that is being faced today by many of us who have spent considerable time reviewing Water Quality Technical Group draft documents over the past year is that much of this program was formulated before there was any significant involvement of non-agency personnel and consultants who were not tied to a particular interest group.

I am not the only one who finds that the program was not initially set up properly. While many of those who were responsible for setting up the technically invalid approaches are no longer involved in the Water Quality Technical Group, those of us who are involved, either as paid consultants, through an agency, or volunteering our time as I do, are finding significant misdirections of the program which the current Water Quality Technical Group management has thus far failed to adequately address. The CALFED Water Quality Program should more appropriately address the concerns of those who are active in current advisory committees. If the current problems are not resolved, CALFED is going to face significant opposition to its water quality management programs.

Since my original review of the draft CALFED Water Quality Program Plan, the CALFED WQTG management has announced a new initiative associated with defining some of

the details of the "action items". As discussed by the Water Quality Technical Group management, this activity was supposed to address many of the concerns that others and I have raised about the current direction of the program. As it has turned out thus far, this new initiative has not yet formulated technically valid approaches for defining and then managing many of the significant water quality problems within the Delta and its tributaries.

Page 3 lists the development of the stakeholder involvement throughout, where in 1995 and 1996 Phase 1 was conducted. This is when the mistakes were made that are causing significant problems today in the formulation of the CALFED Water Quality Management Program.

Page 4, end of the last paragraph, which mentions the involvement of additional stakeholders, needs to reflect that the additional - current stakeholders, i.e. those with sufficient interest to spend time on this topic, are finding that the initial formulation of the program was not done correctly with respect to selecting parameters of concern, target values, and especially proposed actions to initiate control of the parameters of concern.

The statement on the top of page 5, left paragraph about the WQTG meeting regularly, is not appropriate. From my perspective, this group has not met frequently enough to properly correct the errors that were made in the initial formulation of the program. Further, when meetings were held, they were usually of such limited duration, compared to the magnitude of the issues that needed to be discussed, that it was not possible to properly discuss issues.

This same type of statement occurs in the first column at the bottom of page 7. CALFED is far away from having a consensus of those currently active in Program review on what are the appropriate parameters of concern, etc. We are not even sure whether many of the listed parameters of concern cause real impairments, or simply reflect the overly protective nature of how US EPA develops water quality criteria and their implementation into water quality standards as applied to Delta-type waters. As I have repeatedly recommended, there is need to revisit the basic foundations of the parameters of concern list where a program is developed to determine whether the parameters listed cause real water quality use impairments in the Delta or significantly adversely impact Delta resources. This should be the first phase of the WQTG program.

Page 8, right column, first full paragraph, lists so-called water quality actions. I have previously commented on the technical unreliability of many of the proposed water quality actions concerned with urban and industrial runoff. Similar problems exist with some of the other proposed actions.

Page 9, left column, last paragraph, mentions selenium. While many of the sources of selenium are known, as are many of the sources of mercury, the water quality use impairment significance of either selenium or mercury is unknown. If anything, selenium's significance to water quality is even more poorly understood than that of mercury. The actual situation is just the opposite of what is stated.

Page 12, first bulleted item, column two, states under "Indicators of Success" for controlling runoff from mining areas, "*Tissue level concentrations in aquatic organisms that are not harmful to the organism.*" This statement reflects a lack of understanding of the potential water quality significance of copper, zinc and cadmium. I have been involved in critically reviewing the information on aquatic organism tissue residues relative to the impact on organisms for over 25 years. This review has included recently examining the Corps of Engineers' comprehensive database on this topic. I can unequivocally state, and I know that a proper peer review of this issue would show, that there is no way to reliably evaluate, based on the information available today or that which will likely become available in the near future, what constitutes an excessive concentration of heavy metals or organics in the aquatic organism tissue that is harmful to that organism. The reason for the concern about tissue residues is not the impact on the organism containing the residue, but rather on the higher trophic-level organisms, such as man, who use the organism as food. Further, those familiar with the water quality significance of copper, zinc and cadmium know that the issue of concern is toxicity to aquatic life, not bioaccumulation, as stated in this draft Plan.

With respect to the "Performance Measures" set forth in the left column on page 12, while reducing the load's toxic/available forms of copper, cadmium and zinc is appropriate with respect to protecting the aquatic life in the vicinity of where the load enters a waterbody, it is fairly well-known that these constituents are not causes of toxicity to any significant extent downstream and within the Delta. To justify spending large amounts of CALFED funds controlling copper, zinc and cadmium beyond the current regulatory efforts should require studies to show that the relatively small areas of the Sacramento River system where copper, cadmium, and zinc are present in toxic forms is significantly adverse to the beneficial uses of Delta resources.

Recently, as part of the Sacramento River Watershed Program, there have been discussions about the current situation with respect to the discharge of heavy metals such as copper, zinc, and cadmium from the Iron Mountain Mine as they may impact the aquatic life resources of the Sacramento River system. A representative of the Redding office of the CVRWQCB indicated that the Iron Mountain Mine discharges are no longer causing exceedance of water quality standards in the Sacramento River at the point where they enter the Sacramento River. Since the Iron Mountain Mine discharges have been listed as a major cause of water quality problems in the Sacramento River system and therefore were at least part of the justification, if not the primary justification, for including several heavy metals as CALFED WQTG parameters of concern, it will be important to determine whether these heavy metals discharged to a tributary of the Sacramento River, do in fact cause real significant water quality use impairments within the Sacramento River watershed that significantly impact Delta resources and therefore are legitimate CALFED areas of concern.

It should be understood, contrary to the statement made in the Plan, that annual total loads of these constituents are not a proper performance measure. The focus must be on toxic, available forms that are significantly adversely impacting the beneficial uses of the Delta and its resources.

This cannot be judged by annual loads, but requires site-specific investigations conducted over short periods of time.

The right column on page 12 discusses the mercury situation. The approach outlined for addressing the mercury problem should also be followed for copper, cadmium and zinc, as well as other parameters of concern where consideration is given to toxic available forms that are significantly adverse to the beneficial uses of the Delta and its tributaries.

Beginning on page 13, in the right column, under "Urban and Industrial Runoff," it lists as "Action 1," *"Reduce the impairment of environmental beneficial uses in the Delta, Sacramento and San Joaquin River regions associated with copper, zinc and cadmium from urban and industrial runoff."* Someone not knowledgeable in the topic area could be led to believe that there are significant, well-documented adverse impacts on fish and other aquatic life within the Delta and its tributaries that are caused by these heavy metals in urban area stormwater runoff that occurs either within the Delta or its tributaries. However, contrary to this statement, there are no known or even suspected adverse impacts of urban area stormwater runoff-associated heavy metals to the beneficial uses of the Sacramento River.

This kind of statement is one of the examples of the significant misdirection that was given the CALFED WQTG Program in its initial formulation that still persist today. As I have discussed in detail in previous correspondence, such statements reflect a lack of understanding of the basic element of water quality impact assessment and management as applied to urban area stormwater runoff. Work that my graduate students and I did in the 1960's showed that urban area streets and highway associated heavy metals such as copper, zinc and lead are in non-toxic, non-available forms. Urban stormwater dischargers throughout the state over the past five years, including those in the Sacramento area, have shown that the heavy metals which are present at concentrations above water quality criteria/standards are in non-toxic, non-available forms. Based on recent presentations by the City of Sacramento to the Sacramento River Watershed Program Toxics Subcommittee, while there is toxicity in the urban area stormwater runoff, this toxicity is generally not due to heavy metals, but is primarily due to organophosphate pesticides. Further, and most importantly, while there is toxicity in the stormwater runoff, this toxicity is not of sufficient magnitude to cause toxic conditions to occur in the Sacramento or American Rivers.

The CALFED WQTG urban stormwater runoff water quality issue is not as stated in the draft Plan of being one of heavy metals (copper, zinc and cadmium) in urban stormwater runoff causing *"...impairment of environmental beneficial uses in the Delta, Sacramento River and San Joaquin River regions..."* but is one of whether toxicity in urban creeks in Sacramento and other communities due to the organophosphate pesticides is significantly adverse to Delta resources. This is the issue that needs to be addressed in the WQTG. No CALFED funds should be spent constructing detention basins, etc., as has been recommended by the CALFED WQTG management in its previous publications.

On page 13, under "Research/Monitoring," the second bulleted item focuses on obtaining *"...an improved understanding of the sources and mechanisms of bioaccumulation of cadmium, copper and zinc in the Delta Region"*. This statement reflects the above-discussed lack of understanding of the reason for concern about copper, zinc and cadmium; it is not bioaccumulation but direct aquatic life toxicity.

Page 14, left column, contains the same kind of inappropriate recommendations for control of urban stormwater runoff that I have commented on previously over the past year. The WQTG program should not continue to produce highly unreliable information that could trap the public into spending many millions of dollars unnecessarily to address the control of heavy metals in urban area stormwater runoff. The appropriate approach for CALFED to develop a program to control urban area and highway stormwater runoff associated copper, zinc and cadmium is to first determine whether the current concentrations and loads from urban area and highway stormwater runoff are causing real water quality use impairments in the receiving waters for the runoff. If such use impairments are found, which is highly unlikely based on the information available, then CALFED should proceed to formulate an appropriate approach for controlling the use impairments in accord with current regulatory requirements.

The second component of a credible urban area stormwater runoff water quality management program should be the development and implementation of specific studies designed to investigate whether the water quality significance of the exceedance of the water quality standards for these metals is adverse to the beneficial uses of the receiving waters. If impairment of beneficial uses occurs near the point of discharge or downstream, studies need to be conducted to determine the water quality significance of this impairment to Delta resources to ascertain whether using CALFED funds for their control is appropriate

The third component of a credible CALFED urban area stormwater runoff water quality management program would be to examine what improvement in the designated beneficial uses of the receiving waters for the urban area stormwater runoff would accrue through implementation of the Action Plan for controlling the heavy metals in urban area and highway stormwater runoff to achieve water quality standards. It will be highly likely that in most instances there will be no improvement, even though many tens of millions of dollars will be spent in implementing the CALFED proposed approach. The costs of achieving the levels of control that are specified in this proposed Action Plan, i.e. water quality objectives, with no more than one exceedance of an objective parameter every three years - current Clean Water Act requirements for NPDES-permitted discharges, is at least \$1 to \$2 per person per day in perpetuity for residents of Sacramento and possibly even higher amounts for other communities.

Before CALFED locks the public in these areas into funding this level of financial commitment, CALFED should clearly identify the real water quality use impairment associated with the exceedance of the overly-protective, worst-case water quality standards. Those standards were not developed for the Sacramento River situation. And while the CVRWQCB must use these standards based on current regulatory requirements, there is little doubt that within a few years,

the overly protective nature of these standards, especially associated with the US EPA Independent Applicability Policy, will be significantly reduced, if not totally eliminated. CALFED's Water Quality Management Program must incorporate good science and engineering into its Water Quality Management Program problem definition and management. This is not now being done in the urban area stormwater runoff management program.

Page 14, under "Action 2," lists the reduction of toxicity associated with chlorpyrifos and diazinon in urban and industrial runoff as being related to agricultural drainage and runoff, Action 3. I do not understand the logic behind the tie of urban stormwater runoff toxicity to agricultural stormwater runoff toxicity. While they may be due to the same chemicals, the issues are quite different.

Page 14, right column, under "Research/Monitoring," the two bulleted items fail to address the issue that must be addressed and that has been repeatedly brought to the attention of CALFED Water Quality Technical Group management, namely the water quality significance of the chlorpyrifos and diazinon caused toxicity associated with urban stormwater runoff on the beneficial uses of the receiving waters for the runoff. With respect to CALFED's "fixing" of the Delta, these impacts will likely to be important to Delta resources.

Page 14, right column under "Methods," lists as one of the methods educating homeowners on pesticide use. The CALFED Water Quality Management Plan is inconsistent with respect to toxicity issues. While the heavy metals, copper, zinc and cadmium, are to be controlled irrespective of whether they cause aquatic life toxicity, known toxicants, chlorpyrifos and diazinon, do not have to be controlled to the same degree.

On page 15, under "Indicators of Success," first bulleted item states *"No likely significant toxicity from chlorpyrifos and diazinon in the Delta and San Joaquin River regions."* There is no research program set forth in the CALFED WQTG program to define what constitutes significant toxicity. This is the issue that needs to be addressed by CALFED WQTG.

The second bulleted item states parenthetically *"There is disagreement among the WQTG members as to the applicability of the standard."* The ~~disagreement~~ ^{disagreement} ~~is not a disagreement~~ ^{is not a disagreement} ~~among the WQTG~~ ^{among the WQTG} as

appropriate goals for spending CALFED money. All of the parameters of concern need to be investigated with respect to the problems caused by them, the water quality significance of these problems, and the appropriateness of using CALFED funds to control them.

Page 15, "Research/Monitoring" under Action 3 devoted to DO depletion and nutrients, states under the second bulleted item, *"One way this may be achieved is through development of a mass load model for the South Delta."* Having been involved for over 30 years in nutrient load eutrophication response research and management programs at many places in the U.S. and in other countries, I feel it is highly unlikely that a mass load model for the South Delta will reliably

address the nutrient-related DO depletion problems. It is not clear to me that the low DOs that are discussed are due to nutrient loads, as stated in this write-up on page 15.

Page 15 states, under "Indicators of Success," no impairment of recreational beneficial uses by excessive plant growth caused by nutrient loadings, urban and industrial runoff in the Delta region. The issue of recreational beneficial use impairment and DO depletion is extremely subtle, if it exists. Impairment of recreational beneficial uses related to DO depletion is not an appropriate indicator of nutrient control program success. DO depletion problems have to be judged based on elimination of DO depletion. This cannot be judged by recreational use of Delta waters or, for that matter, even changes in nutrient concentrations. There is a problem in this draft Plan with the fundamental understanding of water quality issues associated with nutrient loads and their impacts in the Delta.

Page 15, Action 4 reduces the impairment of the environmental and drinking water beneficial uses of the Delta associated with turbidity and sediment through source control of urban and industrial runoff. Urban and industrial runoff is not likely a significant source of turbidity for the Delta. Further, the turbidity in the Delta that is of concern with respect to its beneficial uses is associated with algae and in particular, color, not erosional material associated with sediment.

On page 16, under "Research and Monitoring," second item states *"Evaluate the feasibility of detention basins in new developments for control of sediment and its associated pollutants."* A year ago WQTG proposed to require the installation of detention basins for heavy metal control. It was pointed out to the WQTG that this proposed approach was technically invalid with respect to water quality management, since particulate heavy metals that can be removed in a detention basin are well-known to be non-toxic. Now this issue is focused on new construction. New construction is highly regulated under US EPA and State of California stormwater runoff regulations. There should be no need to spend CALFED funds to address this issue.

Page 16 under "Indicators of Success," left column, states *"No likely significant toxicity to aquatic organisms associated with smothering benthic organisms and eggs in spawning gravels."* The smothering of aquatic or benthic organisms and eggs is not a toxicity issue; it is a physical habitat issue.

Page 18, under "Methods to Reduce DO Depletions Due to Wastewater Discharges," asserts that the wastewater should be treated in constructed wetlands. Constructed wetlands can naturally have very low DO, increase the TOC in the discharge waters, and can be, at times, significantly detrimental to the beneficial uses of downstream waters.

Page 18, under "Performance Measures," states *"reduce eutrophication as indicated by EPA algal bioassay."* This is another of the fundamental problems on understanding eutrophication issues as set forth in this Plan. EPA algal bioassays cannot be used as a proper measure of the success of a nutrient control program directed toward controlling excessive

fertilization of a waterbody. This can only be judged by determining the changes in the eutrophication-related water quality parameters, such as planktonic algal chlorophyll, reduced water hyacinth, etc.

Page 18, under "Indicators of Success" first bulleted item states, "*no apparent recreational beneficial uses by excessive plant growth caused by nutrient loadings from wastewater and industrial discharge.*" That statement is not in accord with what is known today about excessive aquatic plant growth in the Delta. There are significant excessive aquatic plant (water hyacinth and attached algae) growths that impair recreational use of the Delta. At this time it is inappropriate to rule out domestic wastewater sources as a contributor to the excessive fertilization that is occurring in the Delta. This is an area that needs to be reviewed as part of the CALFED WQTG program.

Because of lack of time and resources I have stopped my review of the draft Plan. As discussed herein there are so many problems with the technical aspects of this draft Plan that it needs to be rewritten and then resubmitted for review. The rewriting must be done by individuals who have a good basic understanding of fundamental water quality issues that are necessary components of developing a technically valid, cost effective protective water quality management plan for the Delta.

I would be happy to answer any questions that anyone may have about these comments.

Sincerely yours,

Fred

G. Fred Lee, PhD, DEE

GFL:cab

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